



GEOTECHNICAL NOTES

November 2016

1. The Applicant shall be responsible for all subgrade inspection and soil compaction testing associated with any work within a City right-of-way, private property subject to a public access easement, or private property subject to City easement for public utilities or public improvements; and/or any work associated with a sediment control facility, or stormwater management practice. This work shall be completed by or under the supervision of a Professional Engineer licensed in the State of Maryland. For the purposes of these notes and associated approved plans, this Engineer shall be referred to as the Geotechnical Engineer and shall be an independent firm from the Applicant.
2. Any plans subject to NRCS-MD Pond Code 378 Standards/Specifications, as shown on the plans, shall supersede these notes when these notes are less stringent or in case of conflict. Any reference to the Engineer in the 378 Standard/Specifications shall be the Professional Engineer who stamped and sealed the design plans. Any reference to the Geotechnical Engineer shall be the Geotechnical Engineer as defined above or the Geotechnical Engineer who completed certain aspects of the pond design.
3. All inspections, tests, supporting data, reports, and certifications shall be provided to the City of Rockville Department of Public Works (DPW) and shall be sealed by the Geotechnical Engineer. Daily inspection reports, if requested by the City, can be provided without being immediately sealed by the Geotechnical Engineer. These reports shall be compiled, reviewed, sealed and then submitted to DPW at a later date as agreed upon by the City.
4. The Geotechnical Engineer shall approve all fill materials that are used for the project. The Geotechnical Engineer shall obtain samples of proposed fill materials and perform all required testing to determine that fill materials are in conformance with this plan.
5. The Geotechnical Engineer shall provide a report that certifies the subgrade preparation and fill/backfill placement are in conformance with this plan. The certification applies to all fill, backfill, and subgrade operations subject to this plan as detailed in Note #1, including utility trenches. When constructing new roadway pavement this certification report shall be provided prior to the placement of Graded Aggregate Base (GAB). All other certifications shall be provided as requested by the City.
6. All fill and/or backfill material shall be free from organics, frozen material, rocks/stones greater than one and a half inches in any dimension, waste metal products, unsightly debris, toxic material, or other deleterious materials; shall be a minimum of 105 pounds per cubic foot for the maximum dry density according to AASHTO T-180, Method C; and shall not have a liquid limit greater than 30 nor a plasticity index greater than six according to ASTM D-4318. All other materials shall meet the requirements stated in Category 900 of the latest edition of the Maryland State Highway Administration (MSHA) Standard Specifications for Construction and Materials.

7. Compact the material that is one foot below the top of subgrade to at least 92 percent of the maximum dry density per AASHTO T-180. Compact the top one foot to at least 97 percent of the maximum dry density. When necessary, add water or dry the layer in order to compact to the required density. Generally the material shall be within two percent of the optimum moisture content but may be outside of this range if approved by the Geotechnical Engineer.
8. Fill and backfill materials must completely fill all spaces under and adjacent to the structure or pipe. For Stormwater Management embankments, the Applicant shall scarify each lift with a sheepsfoot roller or claw to a minimum depth of two-inches prior to placing the next lift. The Applicant shall scarify embankments parallel with the centerline of the dam core and perpendicular to the principal spillway. Bedding shall be provided in accordance with details indicated on the construction drawings. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four-feet, measured horizontally, to any part of a structure. Under no circumstances shall the Applicant drive equipment over any part of a corrugated metal pipe unless there is a compacted fill of 24-inches or greater over the structure or pipe.
9. At a minimum, compaction tests shall be completed for every lift of fill or backfill. The testing frequency shall be at least once per 150 linear feet of trench or once per 1,500 square feet of fill. At a minimum, there shall be at least one compaction test per lift and a least two compaction tests per day. The Geotechnical Engineer shall supply DPW with certified compaction test results, including certification of pipe bedding subgrade and fill subgrade.
10. Prior to placing any roadway fill on existing grades (original grade after topsoil has been stripped, fill prepared by others outside of this plan or fill not prepared under the supervision of the Geotechnical Engineer), scarify the minimum top eight-inches of soil material. Compact this layer to the compaction requirements in these Notes. Proof-roll this compacted layer using a fully loaded dump truck (minimum 20 ton payload capacity). The Geotechnical Engineer shall inspect the proof-rolling and determine if the subgrade is acceptable or if there are areas that require remediation. Subgrade areas that fail proof-rolling shall be remediated to the satisfaction of the Geotechnical Engineer by either of the following methods:
 - A. Scarifying, moisture conditioning, and re-compaction of the subgrade materials.
 - B. Undercutting soft or unsuitable areas of subgrade and backfilling with compacted select borrow (MSHA Section 916).
 - C. Undercutting of soft or unsuitable areas of subgrade and placing a layer of geotextile covered by # MSHA 57 coarse aggregate (Table 901A).

DPW may approve an alternate approach for soil remediation/improvement if it is recommended and sealed by the Geotechnical Engineer.

11. Except when specified, do not place layers exceeding eight-inches un-compacted depth. Place the material in horizontal layers across the full width of the embankment. Perform all rolling in a longitudinal direction along the embankment. Begin at the outer edges and progress towards the center. Vary the travel paths of traffic and equipment over the width of the embankment to aid in obtaining uniform compaction.
12. Uniformly grade areas to a smooth surface, free of irregular surface changes. Grade and prepare the subgrade section to the lines, grades, cross sections and/or elevations shown on the plans. At all times, maintain the subgrade surface in such condition as to readily drain.

13. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice. Vehicular and equipment traffic shall be distributed across the prepared surface in such a manner as to prevent disturbance. Repair any damage to the prepared subgrade to the satisfaction of the Geotechnical Engineer. The Geotechnical Engineer must approve the storage or stockpiling of heavy loads on a roadway subgrade.
14. Unsuitable existing fill, soft or loose natural soils, organic material, and rubble shall be stripped to approved grades as determined by the Geotechnical Engineer.
15. Protect all structures and utilities from any damage in the handling, processing or compacting of embankment or backfill material. Exercise caution near arches, retaining walls, culverts and utility trenches to prevent undue strain or movement. The Geotechnical Engineer may require the use of specially selected material adjacent to structures to protect against damage. Do not use rock greater than one and a half inches in any dimension adjacent to structures.
16. When placing and compacting embankment on hillsides or against existing embankments, continuously bench the slopes where the slope is steeper than 4:1 when measured at right angles to the roadway or embankment centerline. Perform the benching operation as the embankment is constructed in layers. Maintain a bench width of at least five-feet. Begin each horizontal cut at the intersection of the original ground and the vertical sides of the previous cut. If the material cut from the benches meets fill requirements, compact this material along with the new embankment material.
17. When placing fill over existing pavement, thoroughly break up, scarify, or remove the pavement as specified or as directed by the Geotechnical Engineer.
18. Prior to the placement of asphalt pavement, proof-roll the compacted graded aggregate base (GAB) layer using a fully loaded dump truck (minimum 20 ton payload capacity). The Geotechnical Engineer shall inspect the proof-rolling and determine if the GAB is acceptable or if there are areas that require remediation. GAB areas that fail proof-rolling shall be remediated to the satisfaction of the Geotechnical Engineer by either of the following methods:
 - A. Scarifying, moisture conditioning, and re-compaction of the GAB materials.
 - B. Undercutting soft of unsuitable areas of GAB and replacing with compacted GAB.

DPW may approve an alternate approach for GAB remediation/improvement if it is recommended and sealed by the Geotechnical Engineer. The Geotechnical Engineer shall provide a sealed approval of the GAB prior to placement of asphalt. DPW may accept an oral or email approval while the final approval and reports are being compiled and completed.